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(54) Title: AUTOMATIC PROFILE CHANGING APPARATUS, METHOD AND COMPUTER PROGRAM FOR A WIRELESS TERMINAL

(57) Abstract: Automatic profile changing apparatus, method and computer program that can be coupled to or operated with pre-determined types of equipment, the operation of which is affected by wireless signals transmitted by a wireless terminal or to a predetermined area in which wireless terminals can only be operated in permitted profiles. The automatic profile changing apparatus, method or computer program detects whether wireless signals which interfere with the operation of the predetermined equipment are in the vicinity of the predetermined equipment or whether a wireless terminal is being operated according to a profile not permitted in a predetermined area. The wireless terminal includes a profile change apparatus, method or computer program that is capable of changing the profile of the wireless terminal to a profile which does not interfere with the operation of the predetermined equipment or a profile permitted in the predetermined area in response to a request from the automatic profile changing apparatus, method or computer program.

AUTOMATIC PROFILE CHANGING APPARATUS, METHOD AND COMPUTER PROGRAM FOR A WIRELESS TERMINAL

TECHNICAL FIELD

The present invention relates to an apparatus, method and computer program for automatically changing the profile of a wireless terminal to prevent wireless signals transmitted by the wireless terminal from interfering with the operation of predetermined equipment or to prevent the wireless terminal from operating in a manner not permitted in a predetermined area.

Due to the increasing use of wireless terminals, including mobile phones, personal data assistance (PDA), personal communication services (PCS) terminal, etc., there is increasing concern that the wireless signals transmitted by such wireless terminals can interfere with the operation of predetermined types of equipment or the normal operation of such wireless terminals can be annoying to others in the vicinity of the wireless terminal. In some cases the interference with the operation of predetermined equipment can cause the equipment not to perform in critical situations, such as equipment used in hospitals, airplanes, or near construction sites where explosives are being used. In other cases, the operation of such wireless terminals in their normal mode may cause some inconvenience to others or to the user of the wireless terminal in a predetermined area, such as in theaters, libraries, museums, etc.

Although notices are posted to inform users of wireless terminal to turn off or perform other actions with respect to their wireless terminals when they are approaching predetermined equipment or entering a predetermined area, the users of such wireless terminals may not heed such notices.

Further, it is impossible to post such notices at every location where needed. Also the need for posting such notices may change over time since the location of the predetermined equipment or the predetermined area may change.

Still further, the required change in the mode of operation in the wireless terminal may be different depending on the type of equipment or the area being approached. For example, some equipment may be effected by different frequencies whereas some areas may merely require that the volume of the wireless terminal be muted.

Thus, there is a need for apparatus which can automatically change the mode of operation of wireless terminals when they are operated in or around predetermined equipment or when they are brought into a predetermined area.

DISCLOSURE OF THE INVENTION

The present invention provides an apparatus, method and computer program for automatically

changing the profile of a wireless terminal to prevent wireless signals transmitted by the wireless terminal from interfering with the operation of predetermined equipment or to prevent the wireless terminal from operating in a manner not permitted in a predetermined area.

The present invention provides an automatic profile changing apparatus, method and computer program that can be coupled to or operated with predetermined types of equipment, the operation of which is affected by wireless signals transmitted by a wireless terminal. A profile of a wireless terminal is a mode of operation of the wireless terminal. A profile could, for example, include a mode of operation where the wireless terminal is not allowed to transmit, a mode of operation when the volume of the ringer is muted, a mode of operation where the wireless terminal is completely disabled, etc.

The automatic profile changing apparatus, method or computer program detects whether wireless signals which interfere with the operation of the predetermined equipment are in the vicinity of the predetermined equipment or whether a wireless terminal is being operated according to a profile not permitted in a predetermined area surrounding the predetermined equipment. If such wireless signals are detected, or the wireless terminal is being operated according to a profile not permitted in the predetermined area, the automatic profile changing apparatus, method or computer program requests the wireless terminal to change its profile in a manner so as not to interfere with the operation of the predetermined equipment or to change its profile to a profile permitted in the predetermined area surrounding the predetermined equipment. The automatic profile changing apparatus, method or computer program could also cause the wireless terminal to perform some action such as sound an alarm, or vibrate, thereby notifying the user that they are approaching the vicinity of predetermined equipment or entering a predetermined area. When such notice is issued the profile of the wireless terminal should be changed.

The automatic profile changing apparatus, method and computer program can also be coupled to or operated with the entrance and/or the exit of an enclosed area such as a room, building, airplane, etc. When coupled in this manner, the automatic profile changing apparatus, method or computer program causes the profile of the wireless terminal when entering the enclosed area, to change in a manner so as not to interface with the operation of predetermined equipment that may exist in the enclosed area, or to change in a manner so as not to disturb others who may be in the enclosed area. The automatic profile changing apparatus, method or computer program can also change the profile of the wireless terminal back to its original profile when the wireless terminal exits the enclosed area.

The present invention also provides a wireless terminal having a profile change apparatus, method or computer program that is capable of changing a profile of the wireless terminal to prevent wireless signals transmitted by the wireless terminal from interfering with the operation of predetermined equipment or changing a profile of the wireless terminal to one permitted within a

predetermined area. The profile change apparatus, method or computer program changes the profile of the wireless terminal to a profile requested by the automatic profile changing apparatus, method or computer program. The profile could, for example, be a profile where wireless signals transmitted by the wireless terminal do not interfere with the operation of a predetermined equipment or a profile where operation of the wireless terminal does not disturb other individuals within a predetermined area.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more apparent from the following detailed description, when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a schematic diagram illustrating the automatic profile changing apparatus and the wireless terminal of the present invention;

Fig. 2 is a schematic diagram illustrating the steps performed by the wireless terminal and the automatic profile changing apparatus based upon the detecting of the wireless signals transmitted by the wireless terminal;

Figs 3a and b are schematic diagrams illustrating the steps performed by the wireless terminal and automatic profile changing apparatuses, operating relative to an entrance and an exit of a predetermined area using the Bluetooth Standard;

Fig. 4 is a schematic diagram illustrating the steps performed by the wireless terminal and the automatic profile changing apparatus using a timer, operating relative to an entrance of a predetermined area using the Bluetooth Standard;

Fig. 5 is a schematic diagram illustrating the positioning of automatic profile changing apparatuses at the entrance and the exit of a predetermined area as per Figs. 3a and 3b; and

Fig. 6 is a schematic diagram illustrating the positioning of the automatic profile changing apparatus using a timer relative to an entrance as per Fig. 4.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will be described relative to Figs. 1, 2, 3a-b and 4-6. However, it should be noted that the present invention is not limited to the embodiments illustrated in Figs. 1, 2, 3a-b and 4-6. Many other embodiments that are known or may become known to those of ordinary skill in the art fall within the scope of the embodiments illustrated in Figs. 1, 2, 3a-b and 4-6. Further, it should be noted that the present invention, particularly with respect to the automatic profile changing apparatus and the wireless terminal including a profile change apparatus, are illustrated as including various separate elements. However, these separate elements and the functions performed by these separate

elements can be implemented by software (computer program) stored in a computer readable storage medium in each of the automatic profile changing apparatus and the wireless terminal. The computer readable storage medium could, for example, be Read Only Memory (ROM), Flash Memory, Floppy Disk, etc. The computer program includes various instructions, code, code sections, etc., that when executed, for example, by a processor causes the automatic profile changing apparatus or the wireless terminal in which it is stored to perform the steps illustrated in each of Figs. 2, 3a-b and 4.

The present invention provides an apparatus, method and computer program for automatically changing the profile of a wireless terminal to prevent wireless signals transmitted by the wireless terminal from interfering with the operation of predetermined equipment or to prevent the wireless terminal from operating in a manner not permitted in a predetermined area.

In order to accomplish the above, the present invention provides, as illustrated in Fig. 1, a wireless terminal 20 capable of changing a profile thereof to prevent wireless signals transmitted by the wireless terminal from interfering with the operation of predetermined equipment or changing a profile thereof to prevent operation of the wireless terminal from disturbing other in a predetermined area. The predetermined area could, for example, be an area surrounding the predetermined equipment or could, for example, be an enclosed area which may have positioned therein the predetermined equipment. Further, the predetermined area could be an enclosed area in which particular modes of operation of wireless terminals are restricted. Such areas could, for example, be a theater, museum, airplane, hospital, restaurant, etc.

It should be noted that the profile of the wireless terminal is a mode of operation of the wireless terminal. A profile could, for example, be a mode of operation where the wireless terminal 20 transmits wireless signals, a mode of operation where the terminal 20 is not allowed to transmit wireless signals, a mode of operation where the volume of the ringer of the wireless terminal is muted, a mode of operation where the wireless terminal is completely disabled, etc.

The wireless terminal 20 could, for example, be a mobile phone, a PDA, a PCS terminal, etc. If, for example, the wireless terminal is a mobile phone, then the wireless terminal could, for example, operate according to the Global System for Mobile communications (GSM) standard or the Code Division Multiple Access (CDMA) standard in connection with a wireless telecommunications network. Wireless signals transmitted according to the GSM standard could, for example, including wireless signals formatted according to Time Division Multiple Access (TDMS) or derivatives thereof. Further, the wireless terminal 20 could, for example, be enabled to operate according to the Bluetooth Standard which is a specification for small-form factor low-cost, short range radio links between mobile PCs, mobile phones and other portable devices.

The Bluetooth Standard covers a technology that facilitates real-time voice and data transmission. The technology makes it possible to connect any portable and stationary communication

device as easily as switching on the lights. A device that is equipped with a Bluetooth radio can establish instant connection to another device similarly equipped as soon as it comes into range. Connections are instantaneous and they are maintained even when devices are not within line of sight. The range of each radio is approximately 10 meters, but it can be extended to around 100 meters with an optional amplifier. A radio configured according to the Bluetooth Standard operates in a globally available 2.4 Ghz ISM band, ensuring communication compatibility worldwide.

The wireless terminal 20 as illustrated in Fig. 1 includes a transceiver 21 which transmits and receives wireless signals and a detector 202 which detects whether the wireless signals received by the transmitter includes a profile change signal indicating the wireless terminal 20 is being requested to change a profile thereof. The wireless terminal 20 could, for example, be operating according to a profile where the wireless terminal can transmit wireless signals or where the ringer is set to a loud volume.

The wireless terminal 20 also includes a profile change circuit 203 which, in response to detection of the profile change signal by the detector 202, changes a current profile of the wireless terminal to a permitted profile as requested by the automatic profile changing apparatus 10. The profile change circuit 203 can, for example, be implemented by the interactions of a processor 2031 and a memory 2032. The processor 2031 executes instructions of a computer program stored in memory 2032 so as to perform the above described functions of the profile change circuit and control the operation of the wireless terminal 20 including all of its elements. A more detailed description of the operations performed by the profile change circuit 203 as implemented by the execution of a computer program stored in memory 2032 by the processor 2031 are described below with respect to Figs. 2, 3a-b and 4. However, the discussions below with respect to the functions and steps performed by the wireless terminal 20 and the profile change circuit 203 will be described in general and the specific interactions between the processor 2031 and the memory 2032 and all of the elements of the wireless terminal 20 will not be described. However, it is understood and well known to those of ordinary skill in the art that each of the operations described below and illustrated in Figs. 2, 3a-b, and 4 can be implemented by execution of code including instructions of a computer program that is stored in memory 2032 by the processor 2031 and that such a computer program can be drafted based on the discussion and figures herein.

The current profile of the wireless terminal 20 can be stored in a profile data storage 204 along with other profiles in which the wireless terminal 20 can be operated. Thus, in response to the profile change signal the wireless terminal 20 selects anyone of the permitted profiles stored in the profile data storage 204 requested by the automatic profile changing apparatus 10. Further, by use of the profile data storage 204 and the profile changing circuit 203, information concerning the current profile in which the wireless terminal 20 is being operated can be transmitted to the automatic profile

changing apparatus 20.

A timer 205 is also provided in the wireless terminal 20. It should be noted that the functions of the timer 205 can be implemented by execution of code including instructions of the computer program stored in memory 2032 by the processor 2031 as described above.

The timer 205 can be used in a manner to count the time between the point where the profile of the wireless terminal 20 has been changed in response to a profile change signal to a point where the elapsed time equals a predetermined time value. The timer 205 can be used to cause the wireless terminal 20 to maintain a requested profile for a predetermined period of time before switching back to its original profile.

Further, in order to accomplish the above, the present invention provides, as illustrated in Fig. 1, an automatic profile changing apparatus 10 which can be coupled to predetermined types of equipment or a predetermined area 30. The predetermined equipment is equipment in which the operation thereof is affected by wireless signals transmitted by the wireless terminal 20. The automatic profile changing apparatus could also be included in a device which can be operated as needed by an individual such as the pilot of an airplane.

The automatic profile changing apparatus can detect whether wireless signals which interfere with the operation of the predetermined equipment are in the vicinity of the predetermined equipment 30 or whether a wireless terminal is being operated according to a profile not permitted in a predetermined area 30. The predetermined area could, for example, be an enclosed area such as a room where predetermined equipment is located, a building such as hospital, an airplane, a theater, a restaurant or the like.

If wireless signals that may affect the operation of predetermined equipment are detected or the wireless terminal is being operated according to a profile not permitted in the predetermined area, then the automatic profile changing apparatus 10 notifies the wireless terminal 20 that its profile has to be changed by transmitting a profile change signal. The profile change signal could request the wireless terminal 20 to change its profile to a profile that does not interfere with the operation of the predetermined equipment or change its profile to a profile permitted in the predetermined area 30. The automatic profile changing apparatus could also cause the wireless terminal to perform some other actions such as sound an alarm or vibrate so as to notify the user that they are approaching the vicinity of predetermined equipment or entered the predetermined area and that profile of the wireless terminal should be manually changed.

The automatic profile changing apparatus can be coupled to the entrance and/or exit of an enclosed area so as to cause wireless terminals entering the enclosed area to change its profile so as not to interfere with the operation of predetermined equipment that may be located in the enclosed area or

to change its profile in a manner so not to disturb others who may be in the enclosed area. The automatic profile changing apparatus can also change the profile of the wireless terminal back to its original profile when the wireless terminal exits the enclosed area.

The automatic profile changing apparatus 10 as illustrated in Fig. 1 includes a transceiver 101 which transmits and receives wireless signals and a detector 102 which detects whether the wireless signals received by the transceiver 101 includes wireless signals transmitted by a wireless terminal that interfere with the operation of predetermined equipment or whether the wireless terminal is being operated according a profile not permitted in the area. The automatic profile changing apparatus also includes a profile change circuit 103 which upon an indication from the detector 102 that the wireless terminal 20 is transmitting wireless signals that interfere with the operation of the predetermined equipment 30 or an indication that the wireless terminal 20 is being operated according to a profile not permitted in the area, transmits via the transceiver 101 a profile change signal. It should be noted that the profile change signal can be transmitted from the automatic profile changing apparatus according to the GSM or CDMA standards or according to the Bluetooth Standard thereby passing the wireless telecommunications network.

The profile change circuit 103 can, for example, be implemented by the interaction of a processor 1031 and a memory 1032. The processor 1031 executes instructions of a computer program stored in memory 1032 so as to perform the above described functions of the profile change circuit and control operation of the automatic profile changing apparatus 10 and all of its elements. A more detailed description of the operations performed by the profile change circuit 103 as implemented by the execution of a computer program stored in memory 1032 by the processor 1031 are described below with respect to Figs. 2, 3a-b and 4. However, the discussions below with respect to the functions and steps performed by the automatic profile changing apparatus and the profile change circuit 103 will be described in general and the specific interactions between the processor 1031 and the memory 1032 and all other elements of the automatic profile changing apparatus 20 will be not described. However, it is understood and well known to those of ordinary skill in the art that each of the operations described below and illustrated in Figs. 2, 3a-b, and 4 can be implemented by execution of code including instructions of a computer program that is stored in memory 2032 by the processor 2031 and that such a computer program can be drafted based on the discussion and figures herein.

The profile change circuit 103 can, for example, receive via the transceiver 101 information indicating the current profile in which the wireless terminal 20 is operating. The information concerning the current profile the wireless terminal 20 is operated in is compared with permitted profile information stored in a profile data storage 104. If the current profile information of the wireless terminal 20 does not match any of the permitted profiles stored in the profile data storage 104 then the profile change circuit 103 transmits via the transceiver 101 a profile change signal. The

profile data storage 104 can also be used to register information concerning the identity and profile information of each wireless terminal that has approached the predetermined equipment or entered the predetermined area.

The automatic profile changing apparatus 10 in combination with the wireless terminal 20 can operate relative to each other in different modes as will be described with respect to Figs. 2, 3a and b and 4-6.

Fig. 2 illustrates the steps performed by the wireless terminal and the automatic profile changing apparatus when the wireless signals, communicated between the wireless terminal 20 and the automatic profile changing apparatus 12, are formatted according to the GSM or CDMA standard. Thus, the embodiment illustrated in Fig. 2 operates without the use of signals formatted according to the Bluetooth Standard. It should be noted as described above, each of the steps illustrated in Fig. 2 can, for example, correspond to execution of code including instructions of a computer program stored in the memory 1032, 2032 by the processor 1031, 2031 of the automatic profile changing apparatus 10 and the wireless terminal 20.

As illustrated in Fig. 2, the wireless terminal 20 constantly transmits radio frequency (RF) signals (wireless signals) 21 which are monitored by the automatic profile changing apparatus 10. Once the automatic profile changing apparatus 10 detects such wireless signals 22 indicating the presence of the wireless terminal 20 in the vicinity of predetermined equipment or entering a predetermined area, then a profile change signal 23 is transmitted from the automatic profile changing apparatus 10. The profile change signal 23 requests the wireless terminal 20 to change to a profile in which the wireless terminal 20 does not transmit wireless signals that interfere with the operation of predetermined equipment or to change to a profile in which the wireless terminal 20 is operated in a manner so as not to disturb other individuals in a predetermined area. It should be noted that the profile change signal 23 can request that the wireless terminal 20 change to any one of a number of different profiles appropriate for the wireless terminal 20 that are permitted in the vicinity of the predetermined equipment or within the predetermined area. Information concerning profiles appropriate for the wireless terminal 20 that are permitted can, for example, be stored in the profile data storage 104 of the automatic profile changing apparatus 10 as illustrated in Fig. 1.

In response to the profile change signal 23, the wireless terminal 20 changes the profile (step 24) of the wireless terminal 20 to a profile, wherein the wireless signals transmitted by the wireless terminal 20 do not interfere with the operation of predetermined equipment or to a profile in which the operation of the wireless terminal 20 does not disturb other individuals in the predetermined area. The profile to which the wireless terminal 20 is changed can be a profile requested by the profile change signal 23. Therefore, the profile to which the wireless terminal 20 is changed can, for example, be a profile which disables the transmitting function of the wireless terminal 20 or a profile which prevents

the ringer of the wireless terminal 20 from being audible.

The wireless terminal upon changing its profile (step 24) in response to the profile change signal 23, then transmits a profile set response signal 25 indicating that the profile requested by the profile change signal 23 has been set in the wireless terminal 20. Thereafter, the wireless terminal 20 notifies the user of the wireless terminal 20 that the profile of the wireless terminal 20 has been changed (step 26).

Figs. 3a and b illustrate the steps performed by the automatic profile changing apparatus 20 and the wireless terminal 10 with respect to each other where automatic profile changing apparatuses 10 are positioned at the entrance and exit of an enclosed area. It should be noted as described above, each of the steps illustrated in Figs. 3a and b can, for example, correspond to execution of code including instructions of a computer program stored in the memory 1032, 2032 by the processor 1031, 2031 of the automatic profile changing apparatus 10 and the wireless terminal 20.

As per Figs. 3a and b, the wireless terminal 20 and the automatic profile changing apparatuses 10 positioned near the entrance and exit of an enclosed area can, for example, communicate with each other using wireless signals formatted according to the Bluetooth Standard. Thus, communications between the wireless terminal 20 and the automatic profile changing apparatuses 10 are conducted outside of the wireless telecommunications network. Communications between the wireless terminal 20 and the automatic profile changing apparatus 10 could also be formatted according to other standards. The enclosed area can, for example, be a hospital, airplane, room, restaurant, etc., wherein either the wireless signals transmitted by the wireless terminal 20 interfere with the operation of predetermined equipment located in the enclosed area or the operation of the wireless terminal 20 disturbs other individuals within the enclosed area.

Fig. 3a illustrates the steps performed by the automatic profile changing apparatus 10 positioned near the entrance and the wireless terminal 20 when the wireless terminal 20 enters the enclosed area. Similar to the operation of the wireless terminal 20 and the automatic profile changing apparatus 10 illustrated in Fig. 2, the wireless terminal 20 constantly transmits wireless signals which may be monitored by the automatic profile changing apparatus 10 positioned at the entrance of the enclosed room. Once the automatic profile changing apparatus 10 positioned at the entrance detects that the wireless terminal 20 has or is about to enter the enclosed area, a profile change signal 31 is transmitted from the automatic profile changing apparatus 10 positioned at the entrance to the wireless terminal 20. The profile change signal 31 can, for example, notify the wireless terminal 20 that its profile is to be changed to a profile permitted within the enclosed area.

The wireless terminal 20 in response to receipt of the profile change signal 31 transmits a signal received response signal 32 to the automatic profile changing apparatus 10 positioned at the entrance indicating that the profile change signal 31 has been received. The signal received response

signal 32 can, for example, include identification (ID) information identifying the wireless terminal 20 or information indicating a current profile of the wireless terminal 20. The automatic profile changing apparatus 10 positioned at the entrance in response to the signal received response signal 32 transmits a profile set request signal 33 indicating a specific profile to which the wireless terminal 20 is to be set. The profile set request signal 33 includes ID information identifying the wireless terminal 20 and profile information indicating a permitted profile to which the wireless terminal 20 is to be set. It should be noted that numerous wireless terminals 20 can exist in the enclosed area and signals directed to particular ones of the wireless terminals 20 are indicated by the inclusion of ID information.

In response to the profile set response signal 33, the wireless terminal 20 changes the profile (step 34) of the wireless terminal 20 to that requested by the profile set request signal 33. The profile to which the wireless terminal 20 is changed could, for example, be a profile where the transmission of wireless signals by the wireless terminal 20 is disabled or a profile where audible sounds are not emitted from the wireless terminal 20.

Upon changing the profile to that requested by the profile set request signal 33, the wireless terminal 20 transmits a profile set request response signal 35 indicating that the profile requested by the profile set request signal 33 has been set. Thereafter, the user of the wireless terminal 20 is notified that the profile of the wireless terminal 20 has been changed to (step 36). The user of the wireless terminal 20 is notified by, for example, the wireless terminal emitting an audible sound, the wireless terminal vibrating, or the display of the wireless terminal blinking.

Fig. 3b illustrates the steps performed by the automatic profile changing apparatus 10 positioned near the exit and the wireless terminal 20 when the wireless terminal 20 exits from the enclosed area. When the wireless terminal 20 exits from the enclosed area, the automatic profile changing apparatus 10 positioned at the exit transmits a return to previous profile set request signal 37 requesting that the wireless terminal 20 return to the profile in which the wireless terminal 20 was operating prior to entering the enclosed area. Information of the original profile could, for example, be retrieved from the profile data storage 204 of the wireless terminal 20. Information concerning the original profile the wireless terminal 20 is operating in prior to entering the enclosed area could, for example, also be stored in association with ID information of the wireless terminal in the profile data storage 104 of the automatic profile changing apparatus for later transmission to the wireless terminal 20.

The wireless terminal 20 in response to the return to previous profile request signal 37, transmits a profile resumed response signal 38 to the automatic profile changing apparatus 10 positioned at the exit of the enclosed area. The profile resumed response signal 38 indicates that the profile in which the wireless terminal 20 was operating in prior to entering the enclosed area has been resumed. Upon transmitting the profile resumed response signal 38, the wireless terminal 20 changes

its profile (step 39) to the profile used by the wireless terminal 20 prior to entering the enclosed area.

Fig. 5 illustrates an example of an enclosed area 50 having an automatic profile changing apparatus 10 positioned at the entrance of the enclosed area and automatic profile changing apparatus 10 positioned at the exit of the enclosed area 50. As described above, the enclosed area 50 could, for example, have positioned therein predetermined equipment 52 such as sensitive medical equipment, or the enclosed area could be an airplane, hospital, theater, museum, restaurant, etc. The automatic profile changing apparatus 10 positioned at the entrance of the enclosed area 50, changes the profile of a wireless terminal 20 entering the enclosed area 50 to, for example, a profile where the wireless terminal is turned off. The automatic profile changing apparatus 10 positioned at the exit of the enclosed area 50, changes the profile of the wireless terminal 20 exiting the enclosed area 50 to its original profile in which it was operating prior to entering the enclosed area 50.

Fig. 4 illustrates the steps performed by the wireless terminal 20 and the automatic profile changing apparatus 10 using a timer relative to an entrance of a predetermined area. It should be noted as described above, each of the steps illustrated in Fig. 4 can, for example, correspond to execution of code including instructions of a computer program stored in the memory 1032, 2032 by the processor 1031, 2031 of the automatic profile changing apparatus 10 and the wireless terminal 20.

Communications between the wireless terminal 20 and the automatic profile changing apparatus 10 are effected using wireless signals formatted according to the Bluetooth Standard. However, it should be noted that the wireless signals can be formatted according to any of the other standards the Bluetooth Standard need not be used.

As illustrated in Fig. 4, the wireless terminal 20 upon approaching the predetermined area receives from the automatic profile changing apparatus 10 the transmission of a register request signal 401 requesting that the wireless terminal 20 register with the automatic profile changing apparatus 10. The wireless terminal 20 in response to the register request signal 401 retrieves information concerning the current profile of the wireless terminal 20 from the profile data storage 204 and transmits a register response signal 402 providing information concerning the current profile of the wireless terminal 20. The current profile of the wireless terminal 20 could, for example, indicate that the wireless terminal is set to a profile wherein all of the functions of the wireless terminal 20 are fully enabled.

Thereafter, various communications are performed between the automatic profile changing apparatus 10 and the wireless terminal 20 to determine whether the current profile of the wireless terminal 20 is a profile not permitted in the predetermined area (step 403). If the current profile of the wireless terminal 20 is a profile not permitted in the predetermined area, then the automatic profile changing apparatus 10 transmits a profile change signal 404 notifying the wireless terminal 20 that it must change its profile to a profile permitted in the predetermined area. In response to the profile change signal 404, the wireless terminal 20 transmits a signal received response signal

405 to the automatic profile changing apparatus 10 indicating that the profile change signal 404 has been received. The signal received response signal 405 could, for example, include ID information identifying the wireless terminal 20.

Thereafter, the automatic profile changing apparatus 10, in response to the signal received response signal 405, transmits a profile set request signal 406 requesting that the profile of the wireless terminal 20 be changed to a profile permitted in the predetermined area. The profile set request signal 406 could, for example, include ID information identifying the wireless terminal 20, information identifying a profile permitted in the predetermined area to which the wireless terminal 20 is to be set and a timer value to be used by the timer 205 to measure the time elapsed between the changing of the profile of the wireless terminal 20 to a profile permitted in the predetermined area and a predetermined period of time.

In response to the profile set request signal 406, the wireless terminal 20 changes the profile of the wireless terminal to the profile requested (step 407) indicated in the profile set request signal 406. The wireless terminal 20 thereafter transmits a profile set response signal 408 indicating that the profile of the wireless terminal 20 has been changed to the profile requested by the profile set request signal 406.

After transmitting the profile set response signal 408, the wireless terminal 20 notifies the user that the profile of the wireless terminal 20 has been changed to (step 409). It should be noted that the profile requested by the profile set request signal 406 could, for example, be a profile which does not allow the wireless terminal to issue an audible noise. Such an audible noise could, for example, disturb other individuals who may, for example, be in a movie, museum, restaurant, etc.

After notifying the user of the wireless terminal that profile of the wireless terminal 20 has been changed, the wireless terminal sets the timer 205 to the timer value included in the profile set request signal 406 and begins decrementing the timer value (step 410). Once the timer 205 reaches zero (step 411) indicating that the time set in the timer 205 has expired, a signal is provided to the profile change circuit 203 requesting that the profile of the wireless terminal 20 be changed back (step 412) to the original profile the wireless terminal 20 was using prior to entering the predetermined area. Thus, the timer maintains the wireless terminal 20 in a profile which may not disturb other individuals in the predetermined area for a preset period of time such as, for example, 90 minutes, the length of an average movie.

The above described feature of the present invention is graphically illustrated in Fig. 6, wherein a wireless terminal 20 upon entering a movie theater 61, is set by the automatic profile changing apparatus 10 to a profile so as not to disturb other individuals in the theater for at least 90 minutes.

As illustrated in Fig. 4, once the profile of the wireless terminal 20 has been changed back

(step 412) to its original profile, the user of the wireless terminal 20 is notified that the profile has been changed back to its original profile (step 413). The above processes and communications are terminated if the wireless terminal 20 is changed back to a profile that is not permitted in the predetermined area. Once the wireless terminal 20 re-enters the predetermined area, the above steps are executed again.

While the present invention has been described in detail and pictorially in the accompanying drawings it is not limited to such details since many changes and modifications recognizable to those of ordinary skill in the art may be made to the invention without departing from the spirit and the scope thereof.

WE CLAIM:

1. An automatic profile changing apparatus for preventing wireless signals transmitted by a wireless terminal from interfering with the operation of predetermined equipment, said profile changing apparatus comprising:
 - a receiver which receives wireless signals;
 - a detector which detects whether said wireless signals include wireless signals transmitted by said wireless terminal that interfere with the operation of said predetermined equipment; and
 - a transmitter which transmits a profile change signal to said wireless terminal, thereby causing a profile of said wireless terminal to change in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.
2. An automatic profile changing apparatus according to claim 1, wherein said wireless signals include wireless signals formatted according to the Code Division Multiple Access (CDMA) standard that interfere with the predetermined equipment.
3. An automatic profile changing apparatus according to claim 1, wherein said wireless signals include wireless signals formatted according to the Global System for Mobile communications (GSM) standard that interfere with the predetermined equipment.
4. An automatic profile changing apparatus according to claim 1, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.
5. An automatic profile changing apparatus according to claim 2, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.
6. An automatic profile changing apparatus according to claim 3, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.
7. An automatic profile changing apparatus according to claim 1, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user

of said wireless terminal that a profile thereof has been changed.

8. An automatic profile changing apparatus according to claim 2, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

9. An automatic profile changing apparatus according to claim 3, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

10. An automatic profile changing apparatus according to claim 4, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

11. An automatic profile changing apparatus according to claim 7, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received

and that said predetermined profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

12. An automatic profile changing apparatus according to claim 8, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

13. An automatic profile changing apparatus according to claim 10, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and

wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area,

wherein said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area, transmits a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area, and

wherein said wireless terminal, responsive to said return to previous profile request signal, sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and changes the profile of the wireless terminal to the previous profile.

14. An automatic profile changing apparatus according to claim 11, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and

wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area,

wherein said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area, transmits a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area, and

wherein said wireless terminal, responsive to said return to previous profile request signal, sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and changes the profile of the wireless terminal to the previous profile.

15. An automatic profile changing apparatus according to claim 10, wherein said automatic profile changing apparatus is positioned at an entrance to a predetermined area,

wherein said wireless terminal includes a timer for measuring time elapsed from a point in time when the profile of said wireless terminal has been changed,

wherein said automatic profile changing apparatus transmits in said profile set request signal including a timer value, and

wherein said wireless terminal uses said timer value with said timer so as to measure a predetermined time during which the profile to which said wireless terminal has been changed is maintained for a predetermined period of time, and then changed back to a previous profile in which said wireless terminal was operating prior to entering the predetermined area.

16. A wireless terminal capable of changing a profile thereof to prevent wireless signals transmitted by said wireless terminal from interfering with the operation of predetermined equipment, said wireless terminal comprising:

a receiver which receives wireless signals;

a detector which detects whether said wireless signals include a profile change signal which requests said wireless terminal to change a profile thereof; and

a profile change circuit which changes a profile of said wireless terminal, in response to detection of said profile change signal, in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.

17. A wireless terminal according to claim 16, wherein said wireless signals include wireless signals formatted according to the Code Division Multiple Access (CDMA) standard that interfere with the predetermined equipment.

18. A wireless terminal according to claim 16, wherein said wireless signals include wireless signals formatted according to the Global System for Mobile communications (GSM) standard that interfere with the predetermined equipment.

19. A wireless terminal according to claim 16, wherein said wireless signals include

wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

20. A wireless terminal according to claim 17, wherein said wireless signals includes wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

21. A wireless terminal according to claim 18, wherein said wireless signals includes wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

22. A wireless terminal according to claim 16, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

23. A wireless terminal according to claim 17, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

24. A wireless terminal according to claim 18, wherein said wireless terminal, responsive to receipt of said profile change signal, changes a profile of said wireless terminal, sends a profile set response signal to said profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

25. A wireless terminal according to claim 19, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and notifies a user of said wireless terminal that a

profile thereof has been changed.

26. A wireless terminal according to claim 22, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

27. A wireless terminal according to claim 23, wherein said wireless terminal, responsive to receipt of said profile change signal, sends a signal received response signal including terminal identification (ID) information to said automatic profile changing apparatus indicating receipt of said profile change signal,

wherein said automatic profile changing apparatus, upon receipt of said signal received response signal, registers said terminal ID information, and sends to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and

wherein said wireless terminal, upon receipt of said profile set request signal, changes a profile of said wireless terminal to a predetermined profile, sends a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and notifies a user of said wireless terminal that a profile thereof has been changed.

28. A wireless terminal according to claim 25, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and

wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area,

wherein said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area, transmits a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said

wireless terminal was operating prior to entering the predetermined area, and

wherein said wireless terminal, responsive to said return to previous profile request signal, sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and changes the profile of the wireless terminal to the previous profile.

29. A wireless terminal according to claim 26, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and

wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area,

wherein said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area, transmits a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area, and

wherein said wireless terminal, responsive to said return to previous profile request signal, sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and changes the profile of the wireless terminal to the previous profile.

30. A wireless terminal according to claim 25, wherein said automatic profile changing apparatus is positioned at an entrance to a predetermined area,

wherein said wireless terminal includes a timer for measuring time elapsed from a point in time when the profile of said wireless terminal has been changed,

wherein said automatic profile changing apparatus transmits said profile set request signal including a timer value, and

wherein said wireless terminal uses said timer value with said timer so as to measure a predetermined time, during which the profile to which said wireless terminal has been changed is maintained for a predetermined period of time and then changed back to a previous profile in which said wireless terminal was operating prior to entering said predetermined area.

31. A method of preventing wireless signals transmitted by a wireless terminal from interfering with the operation of predetermined equipment, said method comprising:

receiving wireless signals;

detecting whether said wireless signals include wireless signals transmitted by said wireless terminal that interfere with the operation of said predetermined equipment; and

transmitting a profile change signal to said wireless terminal, thereby causing a profile

of said wireless terminal to change in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.

32. A method according to claim 31, wherein said wireless signals include wireless signals formatted according to the Code Division Multiple Access (CDMA) standard that interfere with the predetermined equipment.

33. A method according to claim 31, wherein said wireless signals include wireless signals formatted according to the Global System for Mobile communications (GSM) standard that interfere with the predetermined equipment.

34. A method according to claim 31, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

35. A method according to claim 32, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

36. A method according to claim 33, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

37. A method according to claim 31, further comprising: said wireless terminal, responsive to receipt of said profile change signal;
changing a profile of said wireless terminal;
sending a profile set response signal to an automatic profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

38. A method according to claim 32, further comprising: said wireless terminal, responsive to receipt of said profile change signal;
changing a profile of said wireless terminal;
sending a profile set response signal to an automatic profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

39. A method according to claim 33, further comprising: said wireless terminal, responsive to receipt of said profile change signal;
changing a profile of said wireless terminal;
sending a profile set response signal to an automatic profile changing apparatus indicating that said profile change signal has been received and that a new profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

40. A method according to claim 34, further comprising: in said wireless terminal, responsive to receipt of said profile change signal;
sending a signal received response signal including terminal identification (ID) information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, responsive to receipt of said profile set request signal;
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

41. A method according to claim 37, further comprising: in said wireless terminal, responsive to receipt of said profile change signal;
sending a signal received response signal including terminal identification (ID) information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, responsive to receipt of said profile set request signal;
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

42. A method according to claim 38, further comprising: in said wireless terminal, responsive to receipt of said profile change signal;
sending a signal received response signal including terminal identification (ID) information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal

received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, responsive to receipt of said profile set request signal;
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

43. A method according to claim 40, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area, said method further comprising:

in said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area: transmitting a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area; and

in said wireless terminal, responsive to said return to previous profile request signal, sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and

changing the profile of the wireless terminal to the previous profile.

44. A method according to claim 41, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area, said method further comprising:

in said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area: transmitting a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area; and

in said wireless terminal, responsive to said return to previous profile request signal,

sends a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and

changing the profile of the wireless terminal to the previous profile.

45. A method according to claim 40, wherein said automatic profile changing apparatus is positioned at an entrance to a predetermined area, and wherein said wireless terminal includes a timer for measuring time elapsed from a point in time when the profile of said wireless terminal has been changed, said method further comprising:

in said automatic profile changing apparatus, transmitting in said profile set request signal including a timer value; and

in said wireless terminal, using said timer value with said timer so as to measure a predetermined time during which the profile to which said wireless terminal has been changing is maintained for a predetermined period of time, and then changed back to a previous profile in which said wireless terminal was operating prior to entering the predetermined area.

46. A method in a wireless terminal of changing a profile thereof to prevent wireless signals transmitted by said wireless terminal from interfering with the operation of predetermined equipment, said method comprising:

receiving wireless signals;

detecting whether said wireless signals include a profile change signal which requests said wireless terminal to change a profile thereof; and

changing a profile of said wireless terminal, in response to detection of said profile change signal, in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.

47. A method according to claim 46, wherein said wireless signals include wireless signals formatted according to the Code Division Multiple Access (CDMA) standard that interfere with the predetermined equipment.

48. A method according to claim 46, wherein said wireless signals include wireless signals formatted according to the Global System for Mobile communications (GSM) standard that interfere with the predetermined equipment.

49. A method according to claim 46, wherein said wireless signals include wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

50. A method according to claim 47, wherein said wireless signals includes wireless

signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

51. A method according to claim 48, wherein said wireless signals includes wireless signals formatted according to the Bluetooth Standard that are used to communicate with said wireless terminal to detect and effect the change of the profile of said wireless terminal.

52. A method according to claim 46, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
changing a profile of said wireless terminal,
sending a profile set response signal to said automatic profile changing apparatus
indicating that said profile change signal has been received and that a new profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

53. A method according to claim 47, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
changing a profile of said wireless terminal,
sending a profile set response signal to said automatic profile changing apparatus
indicating that said profile change signal has been received and that a new profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

54. A method according to claim 48, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
changing a profile of said wireless terminal,
sending a profile set response signal to said automatic profile changing apparatus
indicating that said profile change signal has been received and that a new profile has been set, and
notifying a user of said wireless terminal that a profile thereof has been changed.

55. A method according to claim 49, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
sending a signal received response signal including terminal identification (ID)
information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal
received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless
terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, upon receipt of said profile set request signal:
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus

indicating that said profile set request signal has been received and that said predetermined profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

56. A method according to claim 52, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
sending a signal received response signal including terminal identification (ID) information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, upon receipt of said profile set request signal:
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

57. A method according to claim 53, said method further comprising:
in said wireless terminal, responsive to receipt of said profile change signal:
sending a signal received response signal including terminal identification (ID) information to an automatic profile changing apparatus indicating receipt of said profile change signal;
in said automatic profile changing apparatus, responsive to receipt of said signal received response signal: registering said terminal ID information, and
sending to said wireless terminal a profile set request signal requesting said wireless terminal to be set to a predetermined profile using terminal ID information; and
in said wireless terminal, upon receipt of said profile set request signal:
changing a profile of said wireless terminal to a predetermined profile,
sending a profile set response signal to said automatic profile changing apparatus indicating that said profile set request signal has been received and that said predetermined profile has been set, and

notifying a user of said wireless terminal that a profile thereof has been changed.

58. A method according to claim 55, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area, said method

further comprising:

in said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area: transmitting a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area, and

in said wireless terminal, responsive to said return to previous profile request signal: sending a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and

changing the profile of the wireless terminal to the previous profile.

59. A method according to claim 56, wherein said automatic profile changing apparatus is positioned at an entrance of a predetermined area and said profile change signal is transmitted to said wireless terminal when said wireless terminal enters the predetermined area, and wherein another automatic profile changing apparatus is positioned at an exit of the predetermined area, said method further comprising:

in said another automatic profile changing apparatus, when said wireless terminal exits the predetermined area: transmitting a return to previous profile request signal to said wireless terminal requesting that said wireless terminal change its profile to a profile in which said wireless terminal was operating prior to entering the predetermined area, and

in said wireless terminal, responsive to said return to previous profile request signal: sending a profile resume response signal to said automatic profile changing apparatus indicating that a previous profile the wireless terminal was operating prior to entering the predetermined area has been resumed, and

changing the profile of the wireless terminal to the previous profile.

60. A method according to claim 55, wherein said automatic profile changing apparatus is positioned at an entrance to a predetermined area, and wherein said wireless terminal includes a timer for measuring time elapsed from a point in time when the profile of said wireless terminal has been changed, said method further comprising:

in said automatic profile changing apparatus, transmitting said profile set request signal including a timer value; and

in said wireless terminal using said timer value with said timer so as to measure a predetermined time, during which the profile to which said wireless terminal has been changed is maintained for a predetermined period of time, and then changing back to a previous profile in which said wireless terminal was operating prior to entering said predetermined area.

61. A computer program in a computer readable medium of preventing wireless signals

transmitted by a wireless terminal from interfering with the operation of predetermined equipment, said computer program when executed causes an automatic profile changing apparatus to perform the steps of:

receiving wireless signals;

detecting whether said wireless signals include wireless signals transmitted by said wireless terminal that interfere with the operation of said predetermined equipment; and

transmitting a profile change signal to said wireless terminal, thereby causing a profile of said wireless terminal to change in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.

62. A computer program in a computer readable medium of changing a profile thereof to prevent wireless signals transmitted by said wireless terminal from interfering with the operation of predetermined equipment, said computer program when executed causes a wireless terminal to perform the steps of:

receiving wireless signals;

detecting whether said wireless signals include a profile change signal which requests said wireless terminal to change a profile thereof; and

changing a profile of said wireless terminal, in response to detection of said profile change signal, in a manner to prevent said wireless signals transmitted by said wireless terminal from interfering with the operation of said predetermined equipment.

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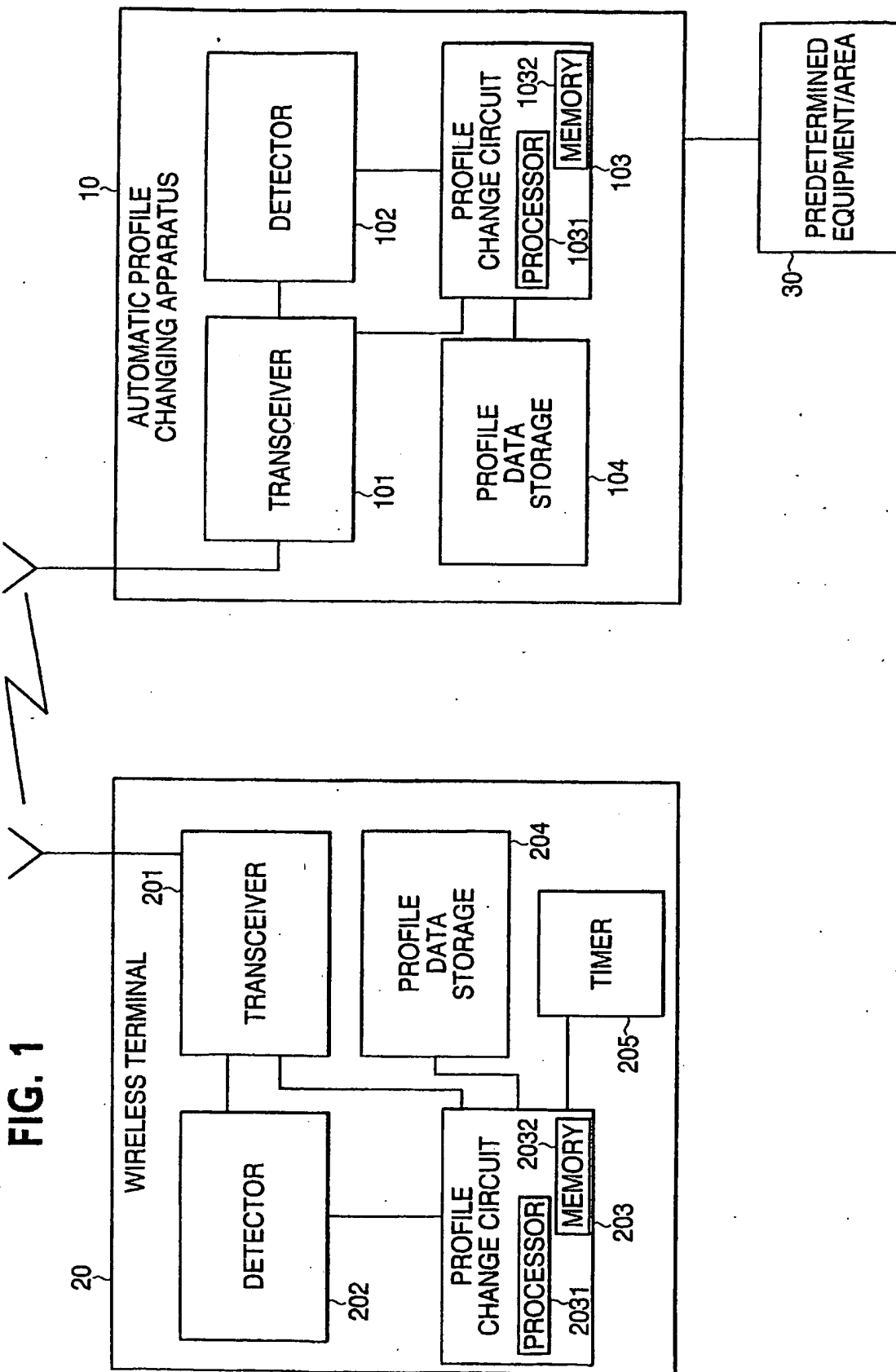


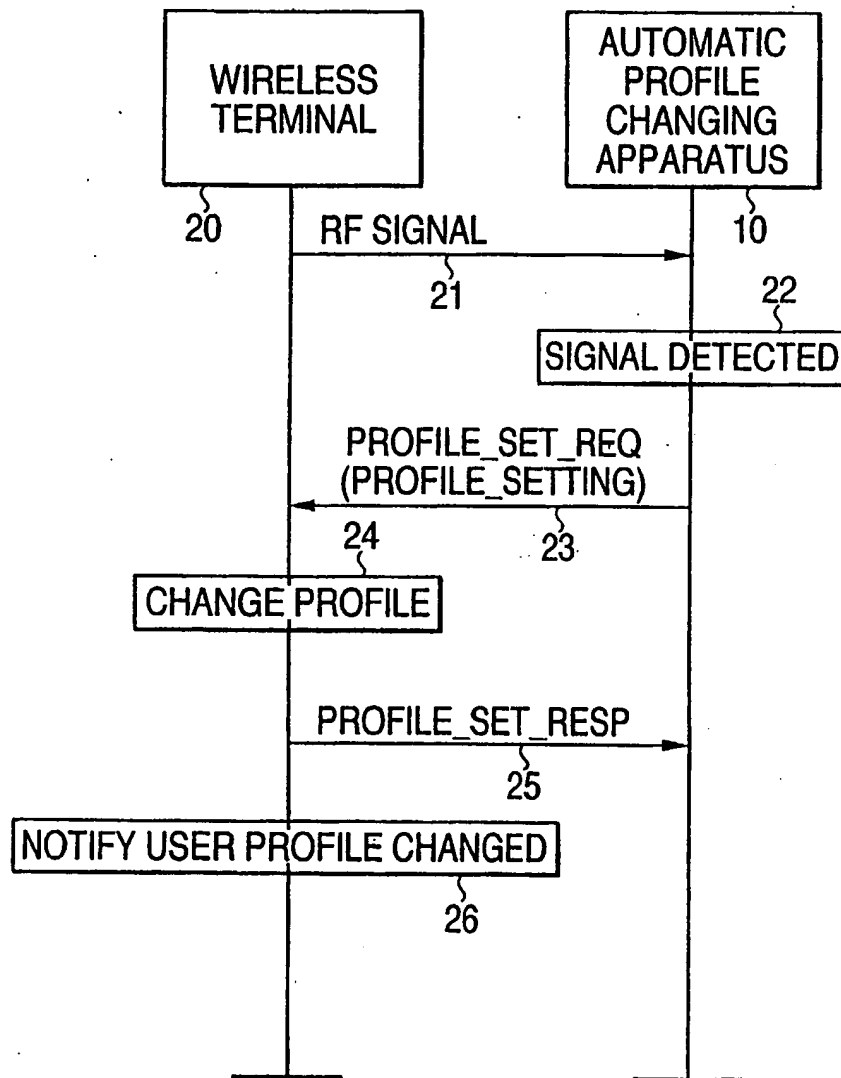
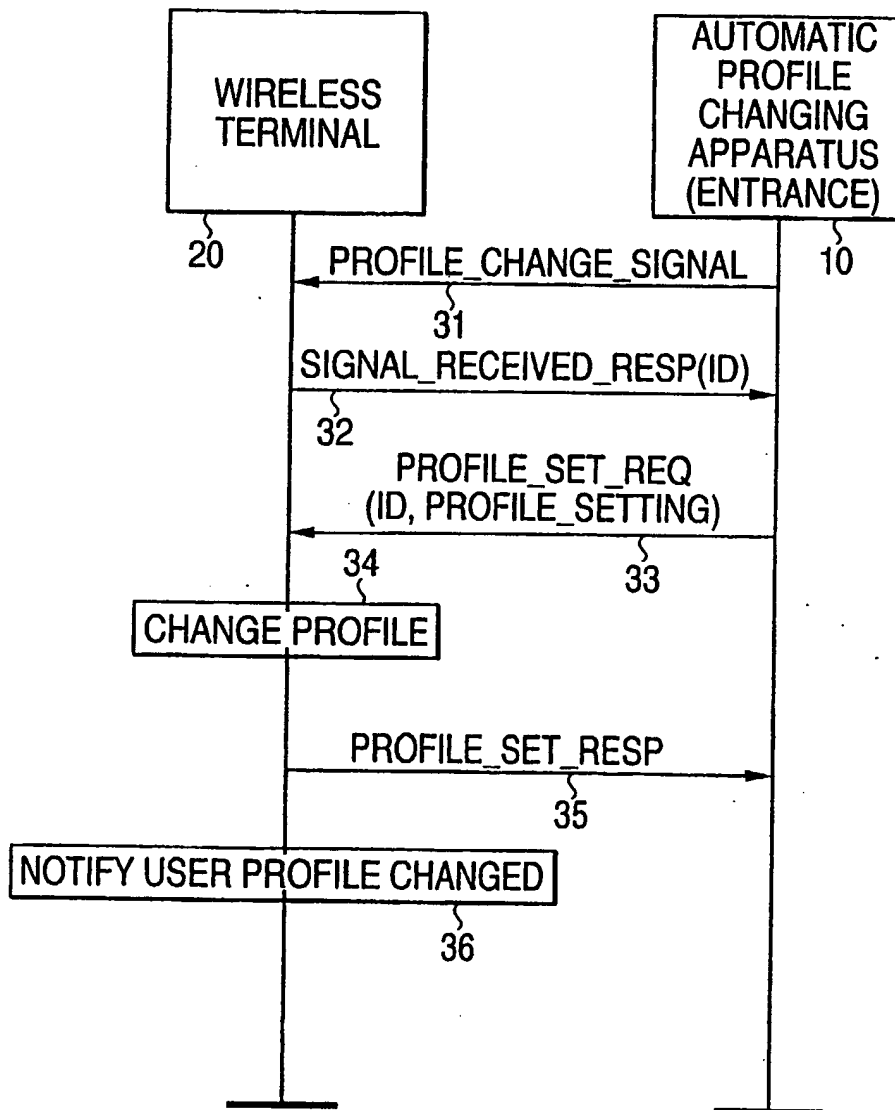
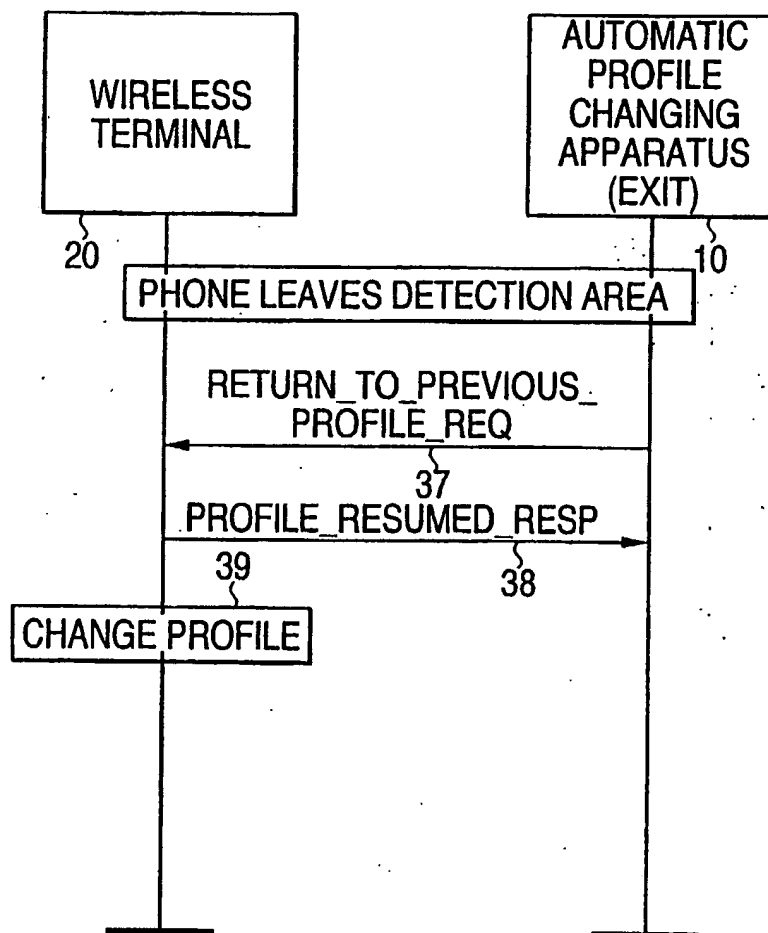
FIG. 2

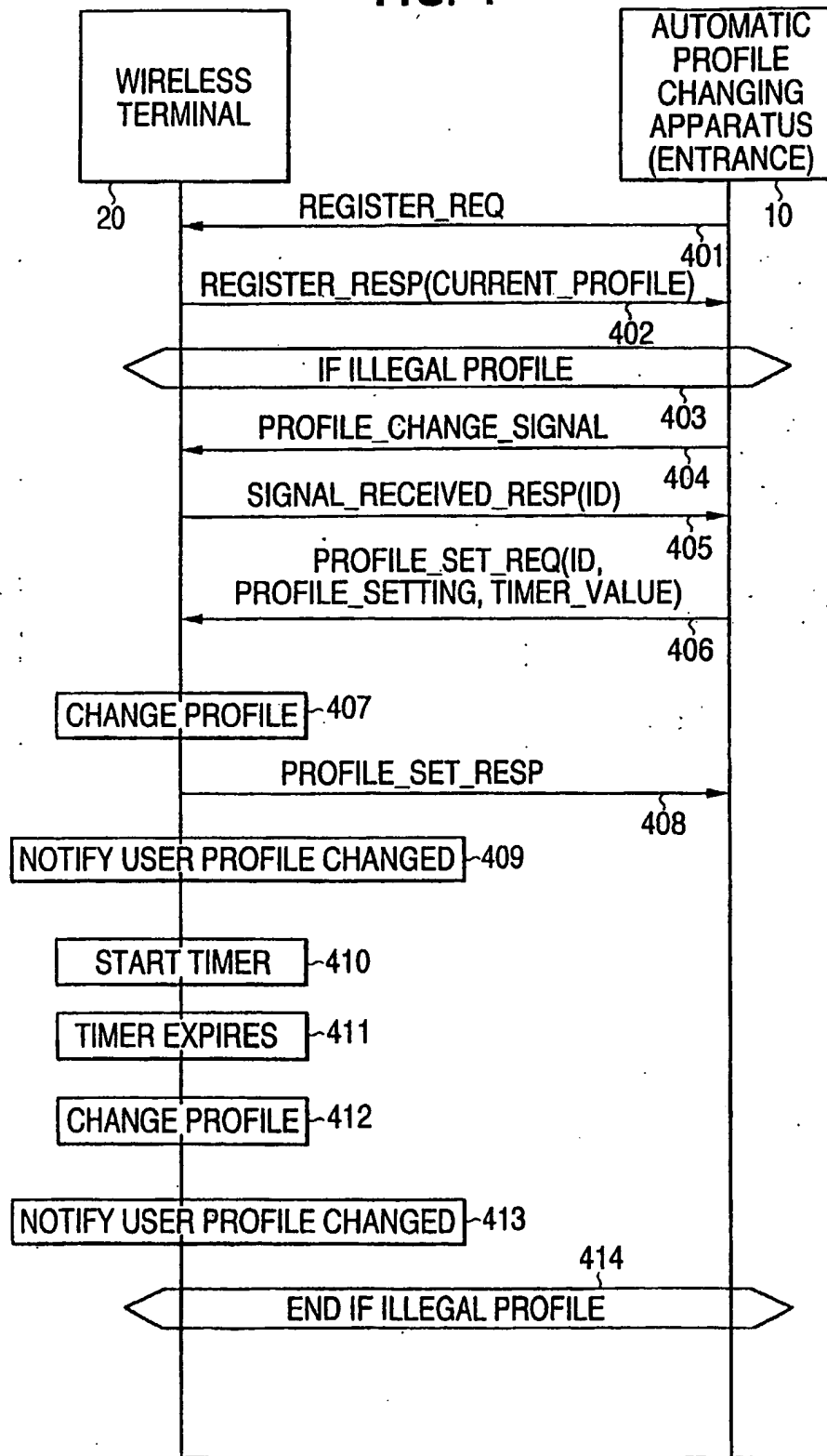
FIG. 3A



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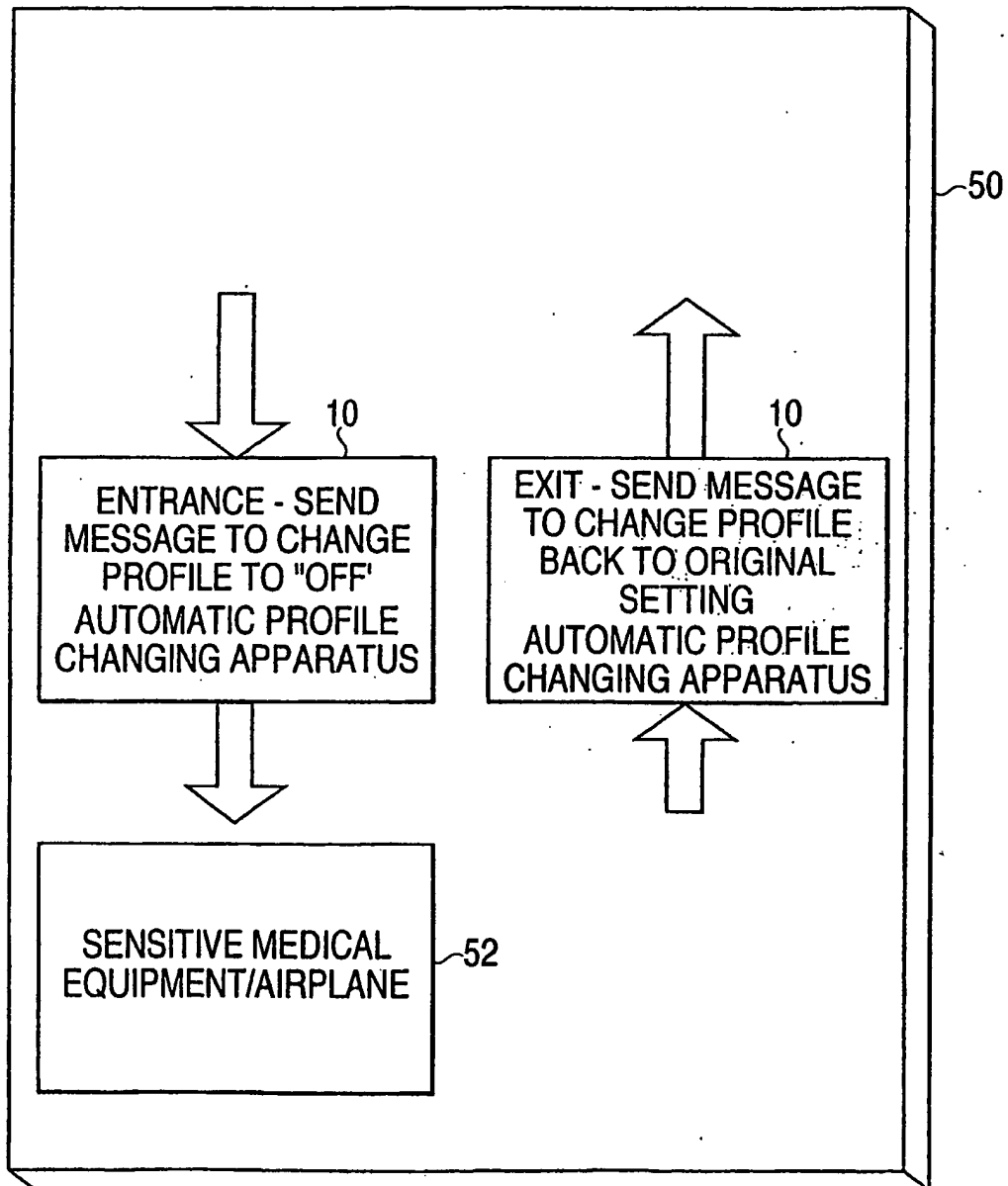
FIG.3B



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FIG. 4

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FIG. 5



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FIG. 6

